



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------|------------------|
| 10/608,496 | 06/30/2003 | Yuko Inatomi | 116391 | 8653 |
| 25944 | 7590 | 06/15/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | VERBITSKY, GAIL KAPLAN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2859 | |

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

✓ *ELC*

| | | | |
|------------------------------|-----------------|----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/608,496 | INATOMI ET AL. | |
| | Examiner | Art Unit | |
| | Gail Verbitsky | 2859 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>one attachment</u> . |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12, 14-16 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over SU 1346977/ SU3984301A [hereinafter SU] in view of Wilcox et al. (U.S. 5038996) [hereinafter Wilcox].

SU discloses a device/ apparatus/ method in the field of applicant's endeavor. The method comprises joining an impurity material (solid gold film) to a thin film of a solid silver material having a thickness d (diffusion length L). The two solid materials are placed in a thermostat and subject to heating and applying of a constant magnetic field perpendicular to the surface of the joined films. A coefficient of diffusion is being determined by using a formula $D=d^2/4t$ or, when modified, $d=16 (Dt)^{1/2}$, where D is a coefficient of diffusion, d is thickness (diffusion length L), t is a diffusion time. It is inherent, that there is a means to apply the magnetic field. In page 1, lines 13-15, SU states that SU determines coefficient of diffusion of the gold into the silver film (translated by Examiner). Thus, it would imply, that under the term "diffusion coefficient", SU actually means inter-diffusion between the metal films.

SU does not explicitly state that the heating is done to melt the materials. SU does not explicitly state that materials are joined along a gravity direction (vertically) and

Art Unit: 2859

that the magnetic field is applied perpendicular to the gravity direction (horizontally), as stated in claim 8, with the remaining limitations of claims 8-14 and 16.

Wilcox discloses in Figs. 1-3 a device/ method in the field of applicant's endeavor wherein the materials are melted (eutectic state) and inter-diffusion is created between the materials and then cooled (not heated). As shown in Fig. 3, the materials are joined one on top another along the gravity direction (vertically).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method, disclosed by SU, so as to heat the materials up to the melting point/ eutectic state, so as to liquefy the materials and thus, to provide a better bonding between them when they solidify, as very well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to join the materials vertically (along the gravity direction), as taught by Wilcox, because the particular direction, absent any criticality, is only considered to be the "preferred" or "optimum" direction that the person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the particular type of the diffusion furnace being used.

With respect to claim 9: The particular ratio (height and width) of the materials (conductive melts), absent any criticality, is only considered to be the "optimum" ratio used by SU that a person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the type of the conductive materials and the intended use of the device, etc. **See *In re Boesch*, 205 USPQ 215 (CCPA 1980).**

Art Unit: 2859

With respect to claims 4 and 11: the use of the particular material, i.e., graphite, as stated in claims 4 and 11, for the vessel, absent any criticality, is only considered to be the “optimum” material that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide for the probe element disclosed by SU since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. In re Leshin, 125 USPQ 416.

With respect to claims 5 and 12: the particular strength of the magnetic field, i.e., 1 Tesla and over, absent any criticality, is only considered to be the “optimum” strength of the magnetic field, that a person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the desired temperature of heating and the particular materials being used. In re Boesch, 205 USPQ 215 (CCPA 1980).

With respect to claims 7 and 14: the particular material for the melt, i.e., In-Sn, as stated in claim 14, absent any criticality, is only considered to be the “optimum” material, that a person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the desired resulting melt and its intended use. In re Boesch, 205 USPQ 215 (CCPA 1980).

With respect to claim 6: the particular cooling rate, absent any criticality, is only considered to be the “optimum” cooling rate that the person having ordinary skill in the art at the time the invention was made would have been able to determine using routine

Art Unit: 2859

experimentation based, among other things, on the type of materials and their solidification time, etc. See in re Boesch, 205 USPQ 215 (CCPA 1980).

3. Claim 13 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over SU and Wilcox applied to claims 1-12, 14, 15-16 above, and further in view of Sato (U.S. 5304972).

SU and Wilcox disclose the device as stated above in paragraph 2.

They do not explicitly state that the magnetic field is a superconductive magnet orthogonal to gravity, as stated in claim 13.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method used by SU and Wilcox, so as to replace the means for applying magnetic field with a superconducting magnet, as taught by Sato, because both of them are alternate types of means of applying magnetic field which will perform the same function of applying magnetic field to the materials of interest, if one is replaced with another.

Response to Arguments

4. Applicant's arguments filed on April 12, 2005 have been fully considered but they are not persuasive.

Applicant states that SU does not disclose the inter-diffusion coefficient. This argument is not persuasive because, in page 1, lines 13-15, SU states that SU determines coefficient of diffusion of the gold into the silver film (translated by Examiner). Thus, it would imply, that by the term "diffusion coefficient", SU actually means inter-diffusion between the metal films.

Art Unit: 2859

Applicant states that SU does not teach the materials, which are aligned parallel gravity direction (vertically). This argument is not persuasive because, although SU does not expressly teach this limitation, SU is silent about the particular positioning. Wilcox is teaching the missing limitation. Therefore, since, SU does not teach away from Wilcox's suggestion, the combination of SU and Wilcox properly teaches all the limitations claimed by applicant

Applicant states that the Examiner does not have a motivation to combine the two references. This argument is not persuasive because, in response to applicant's argument that there is no suggestion to combine references, the examiner recognizes that there should be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. the test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). The references are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ 545 (CCPA) 1969.

Applicant states that SU does not teach to apply a magnetic field orthogonal to gravity. This argument is not persuasive because, SU teaches to apply the magnetic field orthogonal to the materials positioned for joining. If the materials are positioned parallel to gravity, as already taught by Wilcox, then, the magnetic field of SU would automatically orthogonal to the materials and thus, to the gravity direction.

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

Art Unit: 2859

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Anglemeldete Teinehmer Brochure (attached to the office action) states that the interdiffusion coefficient can be calculated from a Boltzmann-Matano analysis.

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (571) 272-2253 Monday through Friday 8:00 to 4:00 ET.

GKV

Gail Verbitsky 
Primary Patent Examiner, TC 2800

June 08, 2005